REMARKS

Objections

Applicants are herein submitting a new CRF and paper copy of the sequence listing, which includes the sequence on pages 61 and 64. Applicants respectfully request that the Examiner replace this sequence listing with the one on record.

Applicants have also amended the specification to include the SEQ ID NO: for the sequences, thus making this objection moot.

Applicants have withdrawn the claims that recite non-elected inventions, thus making this objection moot.

Priority

Applicants have corrected the status of the nonprovisional patent applications accordingly.

Claim Rejections-35 USC §112

Claims 1-9, 11-12, and 33-38 were rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

In claim 1, the Examiner states SEQ ID NO: 33 is listed as a polypeptide in part (a) and as a polynucleotide in part (b). The Examiner states correction is required.

Applicants have corrected claim 1 by deleting non-elected invention, which included SEQ ID NO: 33, thus alleviating this rejection.

In claim 8, the Examiner states "a" should be changed to --the-- for proper dependency.

Applicants have amended claim 8 changing "a" to --the-- for proper dependency, thus alleviating this rejection.

Claim 9 is indefinite because "plant of claim 7" lacks antecedent basis. Also, "a" should be changed to --the--. Further, the claim does not recite --transformed seed-- and it is unclear if the seed also contains the transgene. The Examiner states that in order for the claims not to read the product of nature, it is suggested that the claims be amended to recite --, wherein the seed comprises the isolated polynucleotide--.

Applicants have amended claim 9 by changing its dependency to claim 8; changing "a" to --the-- ; and adding the recitation --,wherein the seed comprises the isolated polynucleotide--, in order for the claim to not be a product of nature, thus alleviating this rejection.

In claim 33, the Examiner states --isolated--, should be inserted before "APAO", for clarification. Dependent claims 34-38 are included in the rejection.

Applicants have amended claim 33 by inserting --isolated-- before "APAO", for clarification. Applicants thank Examiner for the suggestion. Dependent claims 34-38, by virtue of their dependency contain all the limitation of claim 33, which is now in allowable form. Applicants respectfully request the Examiner to withdraw this rejection.

In claim 34, the Examiner states --sequence-- should be inserted before "identity", for clarification.

Applicants have amended claim 34 by inserting --sequence-- before "identity", for clarification as suggested by the Examiner. Applicants respectfully request the Examiner to withdraw this rejection.

In claims 11 and 35, the Examiner states, "ESP1" is not defined in the specification and it is unclear what the abbreviation stands for.

Applicants traverse this rejection. On page 5, lines 16-17 of the specification, Applicants disclose that "ESP1" is an example of a fumonisin esterase gene. Furthermore, the specification

discloses that ESP1 is a fumonisin esterase gene from the organism *Exophiala spinifera*. The abbreviation "ESP" is an abbreviation coined by the inventors using the "E" from *Exophiala* and the "SP" from *spinifera*. Applicants respectfully request the Examiner to withdraw this rejection.

Claim Rejections-35 USC §112

The Examiner has rejected claims 1-9, 11-12, and 33-38 under 35 USC 112, first paragraph, because the specification, while being enabling for an isolated APAO encoding polynucleotide linked to a an esterase encoding polynucleotide from *Exophiala spinifera* and *Rhinocladiella atrovirens* or the bacteria of ATCC 55552 isolates from maize seed, and plant cell and plants comprising said polynucleotides, does not reasonably provide enablement for any and all APAO and fumonisin esterase encoding polynucleotides from any source or polynucleotide sequences having at least 70% identity to SEQ ID NO: 50, or host cells comprising them.

The Examiner asserts Applicants have not provided guidance for obtaining other fumonisin esterase or APAO encoding polynucleotides. The Examiner alleges that while fumonisin degrading enzymes can be obtained from a variety of sources, not all isolates are able to degrade funonisin.

Additionally, the Examiner asserts Applicants have not provided guidance for any modification to SEQ ID NO: 50 which resulted in a polynucleotide having at least 70% identity thereto and still encoding a polypeptide having APAO activity. Therefore, given the breadth of the claims; lack of guidance; unpredictability; the state of the art; and lack of working examples, undue trial and error experimentations would have been required by one skilled in the art to practice the invention as broadly claimed.

Applicants have amended the claims to recite 95% sequence similarity. One of ordinary skill in this art would expect that with such high sequence similarity, the function of the

polynucleotide would be maintained. Thus, it would not take undue experimentation to provide enablement for any APAO and fumonisin esterase encoding polynucleotide from any source or polynucleotide sequence having at least 95% sequence identity to SEQ ID NO: 50, or host cells comprising them. Moreover, methods such as PCR and hybridization, which are well known in this art, can be used to identify sequences having substantial sequence similarity to the sequences of the invention without undue experimentation. Sequences of the invention can be used to isolate similar sequences from other fumonisin degrading organisms. Such techniques are well known in the art. A patent application "need not teach, and preferably omits, what is well known in the art." *Hybritech Inc. v. Monoclonal Antibodies Inc.*, 802 F.2d 1367, 231 USPQ 81 (Fed. Cir. 1986); MPEP § 601. Thus, Applicants disclosure is enabling.

Furthermore, Applicants' specification provides guidance for any modification to SEQ ID NO: 50 which results in a polynucleotide having at least 95% identity thereto and still encoding a polypeptide having APAO activity. Applicants' specification discloses how hybridization conditions (See page 16, in general) can be employed to detect target sequences to a greater degree than a non-target sequence. Using highly stringent conditions would enable one skilled in the art to detect a polynucleotide having at least 95% sequence identity and encoding a polypeptide having APAO activity, because such conditions reasonably ensure having high complementarity to the target sequence, modified or not. Applicants' claims have been amended to recite 95% sequence similarity and high stringency conditions. Under these conditions, polynucleotides of interest would be so similar that one of ordinary skill in this art would expect the function of the polynucleotide to be maintained. Moreover, routine functional assays as disclosed in the specification could be used to assay APAO activity. (See e.g., Example 5, 12, and 14).

While the Examiner asserts sequence identity does not necessarily mean similar function, Applicants disclose on page 18, well known sequence alignment programs which can be used to align similar sequences. Such alignments would still ensure obtaining a modified sequence with similar chemical properties, especially using a 95% similarity threshold. Applicants also disclose on page 58, Example 12, comparison of APAO sequence with other sequences.

The Federal Circuit has repeatedly stated that enablement is not precluded by the necessity for some experimentation, so long as the experimentation needed to practice the invention is not undue. *In re Wands*, 8 USPQ2d 1400 (Fed Cir 1988). Furthermore, a considerable amount of experimentation is permissible, if it is merely routine, or if the specification provides a reasonable amount of guidance in which the experimentation should proceed. *Id.*

Applicants stress that when evaluating the quantity of experimentation required, the court looks to the amount of experimentation required to practice a single embodiment of the invention, rather than the amount required to practice every embodiment of the invention. For example, in *Wands*, the claims at issue were drawn to immunoassay methods using any monoclonal antibody having a binding affinity for HbsAg of at least 10^{-9} M. The PTO had taken the position that the claim was not enabled as it would take undue experimentation to make the monoclonal antibodies required for the assay. The Federal Circuit reversed and held that the claims were enabled, as the amount of experimentation required to isolate monoclonal antibodies and screen for those having the correct affinity was not undue. *See Id.* Clearly, the Federal Circuit did not contemplate that every antibody useful in the methods of the claim must be identified. Rather, the court considered the amount of experimentation required to identify one or a few monoclonal antibodies having the required affinity. *See also, Johns Hopkins University*

v. Cellpro, 931 F. Supp. 303, 324 (D. Del. 1996), *aff'd in part, vacated in part, and remanded*, 47 USPQ2d 1705 (Fed. Cir. 1998) (stating that the "specification need only enable one mode of making the claimed invention.").

In the instant case, the quantity of experimentation required to practice the invention amounts to two steps, generating a nucleotide sequence having at least 95% sequence identity to SEQ ID NO: 50 and assaying the encoded protein for the deaminase enzyme activity. Ample guidance is therefore provided to allow one of skill in the art to identify additional sequences encompassed by the claims. Consequently, contrary to the conclusions of the Office Action, the quantity of experimentation necessary and the amount of guidance presented in the specification is sufficient to enable the claimed proteins.

Accordingly, Applicants respectfully request that the rejection of claims 1-9, 11-12, and 33-38 under 35 U.S.C. §112, first paragraph, for lack of enablement, be withdrawn.

Written Description

The Examiner has rejected claims 1-9, 11-12, and 33-38 under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

The Examiner states Applicants have not described the specific structural, physical and/or chemical properties common for all fumonisin esterase or APAO encoding sequences. Therefore, the disclosure of a single or few species within the genus would not provide adequate written description for all the species, absent more.

Applicants have amended the claims to recite a specific sequence identify which defines a particular threshold (e.g., 95% sequence identity), which limits the variation permitted among

individual members of the genus. Applicants have also amended claims to recite hybridization under highly stringent conditions to a specified sequence (support for "high stringency" is found in the specification on page 17, lines 13-14), and have specified an assayable functional definition of the polynucleotide sequence (e.g., encodes a polypeptide with deaminase enzyme activity). The hybridization to a specific polynucleotide under specified hybridization conditions coupled with functional characteristics should entitle Applicants to a claim drawn to a genus. The functional test also would enable one skilled in the art to identify members of the claimed genus.

Example 14 of the Revised Interim Written Description Guidelines is directed to a generic claim: a protein having at least 95% sequence identity to the sequence of SEQ ID NO:3, wherein the sequence catalyzes the reaction A → B. The Training Materials concludes that the generic claim of Example 14 is sufficiently described under §112, first paragraph, because: 1) "the single sequence disclosed in SEQ ID NO: 3 is representative of the genus"; and 2) the claim recites a limitation requiring the compound to catalyze the reaction from A → B. The Guidelines conclude that one of skill in art would recognize that the Applicants were in possession of the necessary common attributes possessed by the members of the genus.

Following the analysis of Example 14, Applicants submit that the present claims satisfy the written description requirements of § 112, first paragraph. Specifically, the claims of the present invention encompass nucleotide sequences having at least 95% sequence identity to the amino acid sequence set forth in SEQ ID NO: 50, or comprising the sequence set forth in SEQ ID NO: 51, or hybridizing under stringent conditions to the polynucleotide set forth in SEQ ID NO: 50. As in Example 14, the specification discloses the nucleic acid sequence of SEQ ID NO: 50 and the amino acid sequence of SEQ ID NO: 51 and claims 1 and 34 (and thus their

respective dependent claims) recite a limitation requiring the protein to have a specific function (*i.e.*, deaminase enzyme activity). Consequently, contrary to the conclusion in the Office Action, the sequences encompassed by the claims are defined by relevant identifying physical and chemical properties. In fact, the common attributes or features of the elements possessed by the members of the genus is that the proteins are encoded by nucleotide sequences having at least 95% sequence identity to the disclosed nucleotide sequence of SEQ ID NO: 50.

Accordingly, Applicants respectfully request that the rejection of claims 1-9, 11-12, and 33-38 under 35 U.S.C. §112, first paragraph, for lack of written description, be withdrawn.

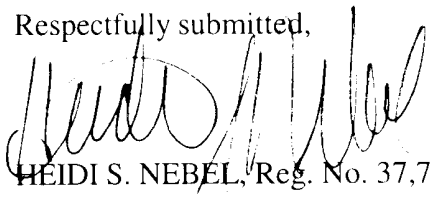
Conclusion

In view of the above amendments and remarks, Applicants submit that the rejections of the claims under 35 U.S.C. § 112, first and second paragraphs, are overcome. Applicants respectfully submit that this application is now in condition for allowance. Early notice to this effect is solicited.

If in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject Application, the Examiner is invited to call the undersigned.

This is a request under the provisions of 37 CFR 1.136 (a) to extend the period for filing a response in the above-identified application for 2 months from January 2, 2003 to April 2, 2003. Applicant is a large entity; therefore please charge Deposit Account No. 26-0084 in the amount of $410.00 to cover the cost of the two month extension. Any deficiency or overpayment should be charged or credited to Deposit Account 26-0084.

Respectfully submitted,



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